



Analytical Laboratory

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13339 Hagers Ferry Road
Huntersville, NC 28078-7929
McGuire Nuclear Complex - MG03A2
Phone: 980-875-5245 Fax: 980-875-4349

Order Summary Report

Order Number: J11100235

Customer Name(s): Bill Kennedy, Melonie Martin, Wayne Chapman, Tom Johnson

Customer Address: 3195 Pine Hall Rd
Mailcode: Belews Steam Station
Belews Creek, NC 28012

Lab Contact: Jason C Perkins **Phone:** 980-875-5348

Report Authorized By: _____ **Date:** 10/28/2011
(Signature)

Program Comments:

Please contact the Program Manager (Jason C Perkins) with any questions regarding this report.

Data Flags & Calculations:

Any analytical tests or individual analytes within a test flagged with a Qualifier indicate a deviation from the method quality system or quality control requirement. The qualifier description is found at the end of the Certificate of Analysis (sample results) under the qualifiers heading. All results are reported on a dry weight basis unless otherwise noted.

Data Package:

This data package includes analytical results that are applicable only to the samples described in this narrative. An estimation of the uncertainty of measurement for the results in the report is available upon request. This report shall not be reproduced, except in full, without the written consent of the Analytical Laboratory. Please contact the Analytical laboratory with any questions. The order of individual sections within this report is as follows:

Job Summary Report, Sample Identification, Technical Validation of Data Package, Analytical Laboratory Certificate of Analysis, Analytical Laboratory QC Reports, Sub-contracted Laboratory Results, Customer Specific Data Sheets, Reports & Documentation, Customer Database Entries, Test Case Narratives, Chain of Custody (COC)

Certification:

The Analytical Laboratory holds the following State Certifications : North Carolina (DENR) Certificate #248, South Carolina (DHEC) Laboratory ID # 99005. Contact the Analytical Laboratory for definitive information about the certification status of specific methods.

Sample ID's & Descriptions:

Sample ID	Plant/Station	Collection Date and Time	Collected By	Sample Description
2011022452	BELEWS	12-Oct-11 9:15 AM	TO	FGD Purge Eff
2011022453	BELEWS	12-Oct-11 9:15 AM	TO	BIOREACTOR 1 INF.
2011022454	BELEWS	12-Oct-11 9:15 AM	TO	BIOREACTOR 2 EFF.
2011022455	BELEWS	12-Oct-11 9:15 AM	TO	BIOREACTOR 1 INF. BLANK
2011022456	BELEWS	12-Oct-11 9:15 AM	TO	BIOREACTOR 2 EFF. BLANK
2011022457	BELEWS	12-Oct-11 9:15 AM	TO	FILTER BLANK
2011022458	BELEWS	12-Oct-11 9:15 AM	TO	Trip Blank
7 Total Samples				

Technical Validation Review

Checklist:

COC and .pdf report are in agreement with sample totals and analyses (compliance programs and procedures).

☒ Yes

☐ No

All Results are less than the laboratory reporting limits.

☐ Yes

☒ No

All laboratory QA/QC requirements are acceptable.

☒ Yes

☐ No

The Vendor Laboratories have been qualified by the Analytical Laboratory

Yes

Report Sections Included:

☒ Job Summary Report

☒ Sample Identification

☒ Technical Validation of Data Package

☒ Analytical Laboratory Certificate of Analysis

☐ Analytical Laboratory QC Report

☒ Sub-contracted Laboratory Results

☐ Customer Specific Data Sheets, Reports, & Documentation

☐ Customer Database Entries

☒ Chain of Custody

☒ Electronic Data Deliverable (EDD) Sent Separately

Reviewed By: DataBase Administrator

Date: 10/28/2011

Certificate of Laboratory Analysis

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Order # J11100235

Site: FGD Purge Eff

Collection Date: 12-Oct-11 9:15 AM

Sample #: 2011022452

Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	Method	Analysis Date/Time	Analyst
<u>ALKALINITY (FIXED END POINT 4.5)</u>							
Vendor Parameter	Complete				V_PRISM		
<u>Carbonate, Bicarbonate, and Hydroxide Alkalinity</u>							
Hydroxide (OH)	Complete				V_PRISM		
Carbonate (CO3)	Complete				V_PRISM		
Bicarbonate (HCO3)	Complete				V_PRISM		
<u>NITRITE + NITRATE (COLORIMETRIC)</u>							
Nitrite + Nitrate (Colorimetric)	18	mg-N/L		0.25	EPA 353.2	18-Oct-11 13:08	BGN9034
<u>INORGANIC IONS BY IC</u>							
Bromide	100	mg/L		5	EPA 300.0	20-Oct-11 14:40	JAHERMA
Chloride	7200	mg/L		100	EPA 300.0	20-Oct-11 14:40	JAHERMA
Sulfate	1200	mg/L		100	EPA 300.0	20-Oct-11 14:40	JAHERMA
<u>MERCURY (COLD VAPOR) IN WATER</u>							
Mercury (Hg)	365	ug/L		5	EPA 245.1	21-Oct-11 10:10	AGIBBS
<u>Mercury Dissolved (cold vapor) in Water (Filtered)</u>							
Mercury (Hg)	56.6	ug/L		2.5	EPA 245.1	21-Oct-11 10:58	AGIBBS
<u>TOTAL RECOVERABLE METALS BY ICP</u>							
Boron (B)	184	mg/L		0.5	EPA 200.7	24-Oct-11 14:00	DJSULL1
Calcium (Ca)	4200	mg/L		0.1	EPA 200.7	24-Oct-11 14:00	DJSULL1
Lithium (Li)	0.142	mg/L		0.05	EPA 200.7	24-Oct-11 14:00	DJSULL1
Magnesium (Mg)	633	mg/L		0.05	EPA 200.7	24-Oct-11 14:00	DJSULL1
Potassium (K)	52.1	mg/L		1	EPA 200.7	24-Oct-11 14:00	DJSULL1
Sodium (Na)	44.4	mg/L		0.5	EPA 200.7	24-Oct-11 14:00	DJSULL1
<u>DISSOLVED METALS BY ICP-MS</u>							
Selenium (Se)	1200	ug/L		10	EPA 200.8	19-Oct-11 12:16	KRICHAR
<u>TOTAL RECOVERABLE METALS BY ICP-MS</u>							
Arsenic (As)	152	ug/L		10	EPA 200.8	19-Oct-11 12:35	KRICHAR
Cadmium (Cd)	< 10	ug/L		10	EPA 200.8	19-Oct-11 12:35	KRICHAR
Chromium (Cr)	214	ug/L		10	EPA 200.8	19-Oct-11 12:35	KRICHAR
Copper (Cu)	116	ug/L		10	EPA 200.8	19-Oct-11 12:35	KRICHAR
Nickel (Ni)	180	ug/L		10	EPA 200.8	19-Oct-11 12:35	KRICHAR
Selenium (Se)	5390	ug/L		20	EPA 200.8	19-Oct-11 12:35	KRICHAR
Silver (Ag)	< 10	ug/L		10	EPA 200.8	19-Oct-11 12:35	KRICHAR
Zinc (Zn)	215	ug/L		20	EPA 200.8	19-Oct-11 12:35	KRICHAR

Certificate of Laboratory Analysis

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*This report shall not be reproduced, except in full.***Order # J11100235**

Site: FGD Purge Eff
Collection Date: 12-Oct-11 9:15 AM

Sample #: 2011022452
Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	Method	Analysis Date/Time	Analyst
<u>SELENIUM SPECIATION</u>							
Vendor Parameter	Complete				V_AS&C		
<u>TOTAL DISSOLVED SOLIDS</u>							
TDS	17000	mg/L		200	SM2540C	19-Oct-11 13:25	TJA7067
<u>TOTAL SUSPENDED SOLIDS</u>							
TSS	2900	mg/L		250	SM2540D	14-Oct-11 10:40	TJA7067

Site: BIOREACTOR 1 INF.
Collection Date: 12-Oct-11 9:15 AM

Sample #: 2011022453
Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	Method	Analysis Date/Time	Analyst
<u>ALKALINITY (FIXED END POINT 4.5)</u>							
Vendor Parameter	Complete				V_PRISM		
<u>Carbonate, Bicarbonate, and Hydroxide Alkalinity</u>							
Hydroxide (OH)	Complete				V_PRISM		
Carbonate (CO3)	Complete				V_PRISM		
Bicarbonate (HCO3)	Complete				V_PRISM		
<u>NITRITE + NITRATE (COLORIMETRIC)</u>							
Nitrite + Nitrate (Colorimetric)	15	mg-N/L		0.25	EPA 353.2	18-Oct-11 13:09	BGN9034
<u>INORGANIC IONS BY IC</u>							
Bromide	93	mg/L		5	EPA 300.0	20-Oct-11 14:56	JAHERMA
Chloride	6700	mg/L		100	EPA 300.0	20-Oct-11 14:56	JAHERMA
Sulfate	1300	mg/L		100	EPA 300.0	20-Oct-11 14:56	JAHERMA
<u>MERCURY 1631</u>							
Vendor Parameter	Complete				V_BRAND		
<u>MERCURY (COLD VAPOR) IN WATER</u>							
Mercury (Hg)	40.7	ug/L		2.5	EPA 245.1	21-Oct-11 10:13	AGIBBS
<u>TOTAL RECOVERABLE METALS BY ICP</u>							
Boron (B)	153	mg/L		0.5	EPA 200.7	24-Oct-11 14:04	DJSULL1
Calcium (Ca)	3390	mg/L		0.1	EPA 200.7	24-Oct-11 14:04	DJSULL1
Lithium (Li)	< 0.05	mg/L		0.05	EPA 200.7	24-Oct-11 14:04	DJSULL1
Magnesium (Mg)	536	mg/L		0.05	EPA 200.7	24-Oct-11 14:04	DJSULL1
Potassium (K)	22.2	mg/L		1	EPA 200.7	24-Oct-11 14:04	DJSULL1
Sodium (Na)	40.1	mg/L		0.5	EPA 200.7	24-Oct-11 14:04	DJSULL1

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Site: BIOREACTOR 1 INF.

Collection Date: 12-Oct-11 9:15 AM

Sample #: 2011022453

Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	Method	Analysis Date/Time	Analyst
<u>TOTAL RECOVERABLE METALS BY ICP-MS</u>							
Arsenic (As)	< 10	ug/L		10	EPA 200.8	19-Oct-11 11:55	KRICHAR
Cadmium (Cd)	< 10	ug/L		10	EPA 200.8	19-Oct-11 11:55	KRICHAR
Chromium (Cr)	11.9	ug/L		10	EPA 200.8	19-Oct-11 11:55	KRICHAR
Copper (Cu)	< 10	ug/L		10	EPA 200.8	19-Oct-11 11:55	KRICHAR
Nickel (Ni)	< 10	ug/L		10	EPA 200.8	19-Oct-11 11:55	KRICHAR
Selenium (Se)	1200	ug/L		10	EPA 200.8	19-Oct-11 11:55	KRICHAR
Silver (Ag)	< 10	ug/L		10	EPA 200.8	19-Oct-11 11:55	KRICHAR
Zinc (Zn)	< 20	ug/L		20	EPA 200.8	19-Oct-11 11:55	KRICHAR

SELENIUM SPECIATION

Vendor Parameter Complete V_AS&C

Site: BIOREACTOR 2 EFF.

Collection Date: 12-Oct-11 9:15 AM

Sample #: 2011022454

Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	Method	Analysis Date/Time	Analyst
<u>ALKALINITY (FIXED END POINT 4.5)</u>							
Vendor Parameter	Complete				V_PRISM		
<u>Carbonate, Bicarbonate, and Hydroxide Alkalinity</u>							
Hydroxide (OH)	Complete				V_PRISM		
Carbonate (CO3)	Complete				V_PRISM		
Bicarbonate (HCO3)	Complete				V_PRISM		

NITRITE + NITRATE (COLORIMETRIC)

Nitrite + Nitrate (Colorimetric)	0.019	mg-N/L		0.01	EPA 353.2	18-Oct-11 13:10	BGN9034
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INORGANIC IONS BY IC

Bromide	91	mg/L		5	EPA 300.0	20-Oct-11 15:12	JAHERMA
Chloride	6600	mg/L		100	EPA 300.0	20-Oct-11 15:12	JAHERMA
Sulfate	1500	mg/L		100	EPA 300.0	20-Oct-11 15:12	JAHERMA

MERCURY 1631

Vendor Parameter Complete V_BRAND

MERCURY (COLD VAPOR) IN WATER

Mercury (Hg)	< 1	ug/L		1	EPA 245.1	21-Oct-11 10:15	AGIBBS
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Order # J11100235

Site: BIOREACTOR 2 EFF.

Collection Date: 12-Oct-11 9:15 AM

Sample #: 2011022454

Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	Method	Analysis Date/Time	Analyst
<u>TOTAL RECOVERABLE METALS BY ICP</u>							
Boron (B)	156	mg/L		0.5	EPA 200.7	24-Oct-11 14:08	DJSULL1
Calcium (Ca)	3440	mg/L		0.1	EPA 200.7	24-Oct-11 14:08	DJSULL1
Lithium (Li)	< 0.05	mg/L		0.05	EPA 200.7	24-Oct-11 14:08	DJSULL1
Magnesium (Mg)	529	mg/L		0.05	EPA 200.7	24-Oct-11 14:08	DJSULL1
Potassium (K)	27.3	mg/L		1	EPA 200.7	24-Oct-11 14:08	DJSULL1
Sodium (Na)	40.4	mg/L		0.5	EPA 200.7	24-Oct-11 14:08	DJSULL1

TOTAL RECOVERABLE METALS BY ICP-MS

Arsenic (As)	< 5	ug/L		5	EPA 200.8	19-Oct-11 11:58	KRICHAR
Cadmium (Cd)	< 5	ug/L		5	EPA 200.8	19-Oct-11 11:58	KRICHAR
Chromium (Cr)	< 5	ug/L		5	EPA 200.8	19-Oct-11 11:58	KRICHAR
Copper (Cu)	< 5	ug/L		5	EPA 200.8	19-Oct-11 11:58	KRICHAR
Nickel (Ni)	< 5	ug/L		5	EPA 200.8	19-Oct-11 11:58	KRICHAR
Selenium (Se)	11.9	ug/L		5	EPA 200.8	19-Oct-11 11:58	KRICHAR
Silver (Ag)	< 5	ug/L		5	EPA 200.8	19-Oct-11 11:58	KRICHAR
Zinc (Zn)	< 10	ug/L		10	EPA 200.8	19-Oct-11 11:58	KRICHAR

SELENIUM SPECIATION

Vendor Parameter **Complete** V_AS&C

Site: BIOREACTOR 1 INF. BLANK

Collection Date: 12-Oct-11 9:15 AM

Sample #: 2011022455

Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	Method	Analysis Date/Time	Analyst
<u>MERCURY 1631</u>							
Vendor Parameter	Complete				V_BRAND		

Site: BIOREACTOR 2 EFF. BLANK

Collection Date: 12-Oct-11 9:15 AM

Sample #: 2011022456

Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	Method	Analysis Date/Time	Analyst
<u>MERCURY 1631</u>							
Vendor Parameter	Complete				V_BRAND		

Certificate of Laboratory Analysis

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Site: FILTER BLANK

Collection Date: 12-Oct-11 9:15 AM

Sample #: 2011022457

Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	Method	Analysis Date/Time	Analyst
<u>DISSOLVED METALS BY ICP-MS</u>							
Selenium (Se)	< 1	ug/L		1	EPA 200.8	19-Oct-11 10:52	KRICHAR

Site: Trip Blank

Collection Date: 12-Oct-11 9:15 AM

Sample #: 2011022458

Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	Method	Analysis Date/Time	Analyst
<u>TOTAL RECOVERABLE METALS BY ICP</u>							
Boron (B)	< 0.05	mg/L		0.05	EPA 200.7	24-Oct-11 13:11	DJSULL1
Calcium (Ca)	0.018	mg/L	R1	0.01	EPA 200.7	24-Oct-11 13:11	DJSULL1
Lithium (Li)	< 0.005	mg/L		0.005	EPA 200.7	24-Oct-11 13:11	DJSULL1
Magnesium (Mg)	0.006	mg/L		0.005	EPA 200.7	24-Oct-11 13:11	DJSULL1
Potassium (K)	< 0.1	mg/L		0.1	EPA 200.7	24-Oct-11 13:11	DJSULL1
Sodium (Na)	< 0.05	mg/L		0.05	EPA 200.7	24-Oct-11 13:11	DJSULL1

TOTAL RECOVERABLE METALS BY ICP-MS

Arsenic (As)	< 1	ug/L		1	EPA 200.8	19-Oct-11 10:39	KRICHAR
Cadmium (Cd)	< 1	ug/L		1	EPA 200.8	19-Oct-11 10:39	KRICHAR
Chromium (Cr)	< 1	ug/L		1	EPA 200.8	19-Oct-11 10:39	KRICHAR
Copper (Cu)	< 1	ug/L		1	EPA 200.8	19-Oct-11 10:39	KRICHAR
Nickel (Ni)	< 1	ug/L		1	EPA 200.8	19-Oct-11 10:39	KRICHAR
Selenium (Se)	< 1	ug/L		1	EPA 200.8	19-Oct-11 10:39	KRICHAR
Silver (Ag)	< 1	ug/L		1	EPA 200.8	19-Oct-11 10:39	KRICHAR
Zinc (Zn)	< 2	ug/L		2	EPA 200.8	19-Oct-11 10:39	KRICHAR

SELENIUM SPECIATION

Vendor Parameter Complete V_AS&C

Qualifiers:**R1** Relative Percent Difference exceeded method acceptance limits, see additional notes

October 26, 2011

Duke Energy
ATTN: Jay Perkins
Scientific Support-Laboratory
13339 Hagers Ferry Road
Huntersville NC 28078
jcperkins@duke-energy.com
labcustomer@duke-energy.com

RE: Project DUK-HV1101

Client Project: J11100235

Dear Mr. Perkins,

On October 14, 2011, Brooks Rand Labs (BRL) received two (2) flue gas desulfurization (FGD) wastewater samples and two (2) corresponding blank samples. Samples were logged-in for total mercury (Hg) analysis. All samples were received, prepared, analyzed, and stored according to BRL SOPs and EPA methodology.

The results were blank-corrected as described in the calculations section of the applicable SOP(s) and may be evaluated using adjusted reporting limits to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific detection limits and other details.

BRL, an accredited laboratory, certifies the reported results of all analyses for which BRL is NELAP accredited meet all NELAP requirements. For more details, see the *Report Information* page of the report.

Please feel free to contact me if you have any questions regarding this report.

Sincerely,



Tiffany Stilwater
Project Manager
tiffany@brooksrn.com

Report Information

Laboratory Accreditation

BRL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BRL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksrand.com/default.asp?contentID=586>. Results reported relate only to the samples listed in the report.

Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

Common Abbreviations

BLK	method blank	MS	matrix spike
BRL	Brooks Rand Labs	MSD	matrix spike duplicate
BS	laboratory fortified blank	ND	non-detect
CAL	calibration standard	NR	non-reportable
CCV	continuing calibration verification	PS	post preparation spike
COC	chain of custody record	REC	percent recovery
CRM	certified reference material	RPD	relative percent difference
D	dissolved fraction	RSD	relative standard deviation
DUP	duplicate	SCV	secondary calibration verification
ICV	initial calibration verification	SOP	standard operating procedure
MDL	method detection limit	SRM	standard reference material
MRL	method reporting limit	T	total recoverable fraction

Definition of Data Qualifiers

(Effective 9/23/09)

B	Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.
E	An estimated value due to the presence of interferences. A full explanation is presented in the narrative.
H	Holding time and/or preservation requirements not met. Result is estimated.
J	Estimated value. A full explanation is presented in the narrative.
J-M	Duplicate precision (RPD) for associated QC sample was not within acceptance criteria. Result is estimated.
J-N	Spike recovery for associated QC sample was not within acceptance criteria. Result is estimated.
M	Duplicate precision (RPD) was not within acceptance criteria. Result is estimated.
N	Spike recovery was not within acceptance criteria. Result is estimated.
R	Rejected, unusable value. A full explanation is presented in the narrative.
U	Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.
X	Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated.

These qualifiers are based on those previously utilized by Brooks Rand, Ltd., those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses; USEPA; July 2002. These supersede all previous qualifiers ever employed by BRL.

Sample Information

Sample	Lab ID	Report Matrix	Type	Sampled	Received
BioReactor 1 Inf	1142045-01	Influent	Sample	10/12/2011	10/14/2011
BioReactor 1 Inf Hg Blk	1142045-02	DIW	Field Blank	10/12/2011	10/14/2011
BioReactor 2 Eff	1142045-03	Effluent	Sample	10/12/2011	10/14/2011
BioReactor 2 Eff Hg Blk	1142045-04	DIW	Field Blank	10/12/2011	10/14/2011

Batch Summary

Analyte	Lab Matrix	Method	Prepared	Analyzed	Batch	Sequence
Hg	Water	EPA 1631	10/21/2011	10/25/2011	B111723	1100738

Sample Results

Sample	Analyte	Report Matrix	Fraction	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
BioReactor 1 Inf										
1142045-01	Hg	Influent	T	42700		76.5	204	ng/L	B111723	1100738
BioReactor 1 Inf Hg Blk										
1142045-02	Hg	DIW	T	0.15	U	0.15	0.40	ng/L	B111723	1100738
BioReactor 2 Eff										
1142045-03	Hg	Effluent	T	464		3.03	8.08	ng/L	B111723	1100738
BioReactor 2 Eff Hg Blk										
1142045-04	Hg	DIW	T	0.15	U	0.15	0.41	ng/L	B111723	1100738

Accuracy & Precision Summary

Batch: B111723
Lab Matrix: Water
Method: EPA 1631

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B111723-SRM1	Certified Reference Material (1140052, THg ICV 1641d)						
	Hg		15.68	14.44	ng/L	92% 85-115	
B111723-MS2	Matrix Spike (1143014-01)						
	Hg	436.0	2020	2506	ng/L	102% 71-125	
B111723-MSD2	Matrix Spike Duplicate (1143014-01)						
	Hg	436.0	2020	2473	ng/L	101% 71-125	1% 24

Method Blanks & Reporting Limits

Batch: B111723
Matrix: Water
Method: EPA 1631
Analyte: Hg

Sample	Result	Units
B111723-BLK1	0.04	ng/L
B111723-BLK2	0.0008	ng/L
B111723-BLK3	0.05	ng/L
B111723-BLK4	0.02	ng/L
Average: 0.03		Standard Deviation: 0.02
Limit: 0.50		Limit: 0.10
		MDL: 0.15
		MRL: 0.41

Instrument Calibration

Sequence: 1100738
Instrument: THG-05
Date: 10/25/2011
Analyte: Hg

Total Mercury and Mercury Speciation by CVAFS
Method: EPA 1631

Lab ID	True Value	Result	Units	REC & Limits	
1100738-IBL1		8.42	pg of Hg		
1100738-IBL2		8.90	pg of Hg		
1100738-IBL3		7.23	pg of Hg		
1100738-IBL4		8.50	pg of Hg		
1100738-CAL1	25.00	24.03	pg of Hg	96%	
1100738-CAL2	100.0	99.48	pg of Hg	99%	
1100738-CAL3	500.0	511.0	pg of Hg	102%	
1100738-CAL4	2500	2549	pg of Hg	102%	
1100738-CAL5	10000	10050	pg of Hg	100%	
1100738-ICV1	1568	1444	pg of Hg	92%	85-115
1100738-CCB1		12.1	pg of Hg		
1100738-CCV1	500.0	514.6	pg of Hg	103%	77-123
1100738-CCB2		8.55	pg of Hg		
1100738-CCV2	500.0	497.9	pg of Hg	100%	77-123
1100738-CCB3		37.1	pg of Hg		
1100738-CCV3	500.0	512.1	pg of Hg	102%	77-123

Sample Containers

Lab ID: 1142045-01 Sample: BioReactor 1 Inf			Report Matrix: Influent Sample Type: Sample			Collected: 10/12/2011 Received: 10/14/2011	
Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle FLPE Hg-T	250mL	71443390 30	none	n/a		Cooler
Lab ID: 1142045-02 Sample: BioReactor 1 Inf Hg Blk			Report Matrix: DIW Sample Type: Field Blank			Collected: 10/12/2011 Received: 10/14/2011	
Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle FLPE Hg-T	250mL	71443390 30	none	n/a		Cooler
Lab ID: 1142045-03 Sample: BioReactor 2 Eff			Report Matrix: Effluent Sample Type: Sample			Collected: 10/12/2011 Received: 10/14/2011	
Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle FLPE Hg-T	250mL	71443390 30	none	n/a		Cooler
Lab ID: 1142045-04 Sample: BioReactor 2 Eff Hg Blk			Report Matrix: DIW Sample Type: Field Blank			Collected: 10/12/2011 Received: 10/14/2011	
Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle FLPE Hg-T	250mL	71443390 30	none	n/a		Cooler

Shipping Containers

Cooler

Received: October 14, 2011 9:00
Tracking No: 472679664810 via FedEx
Coolant Type: Ice
Temperature: 3.6 °C

Description: Cooler
Damaged in transit? No
Returned to client? No

Custody seals present? No
Custody seals intact? No
COC present? Yes

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

7



Duke Energy Analytical Laboratory

Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd
Huntersville, N. C. 28078
(704) 875-5245
Fax: (704) 875-4349

Analytical Laboratory Use Only

LIMS # J11100235	Matrix: OTHER	Samples Originating From NC _____ SC _____
Logged By cpk	Date & Time 10-12-11 1633	SAMPLE PROGRAM Ground Water _____ Drinking Water _____ Waste _____
Cooler Temp (C) Preserv.: 1=HCL H ₂ SO ₄ 3=HNO ₃ 4=Ice 5=None		NPDES _____ UST _____ RCRA _____

Page 15 of 32
Page 1 of 2
DISTRIBUTION
ORIGINAL to LAB,
COPY to CLIENT

1142045

1) Project Name HAPS/MACT Testing Belews Creek	2) Phone No:
2) Client: Bill Kennedy, Ron Laws, Allen Stowe, Wayne Chapman, Melonie Martin, Tom Johnson	4) Fax No:
5) Business Unit:	6) Process:
8) Oper. Unit:	10) Resp. Center:

AS&C
PO#133241

Brooks Rand
PO#141391

PRISM
PO#144725

Customer to complete all
appropriate non-shaded areas.

LAB USE ONLY 13 Lab ID	Se Speciation Bottle ID	13 Sample Description or ID	Date	Time	Signature	16 Analyses Required		17 Comp.	18 Grab	TDS, TSS	Hg - 245.1	Hg Dissolved, 245.1	Metals*	Se, soluble	Se, Speciation, V_ASC	Hg 1631, V_BRand	Carbonate alkalinity, bicarbonate alkalinity, alkalinity total (4.5), pH - V_Prism	Chloride, Sulfate, Bromide - Dionex	Nitrate-nitrite, C, NO3/NO2
						17 Comp.	18 Grab												
011022452		FGD Purge Eff	10/12		TO						1	1	1	1	1		1	1	1
53		BioReactor 1 Inf	10/12	9:15	TO						1		1		1	1	1	1	
55		BioReactor 1 Inf Hg Blk	10/12	9:15	TO										1				
54		BioReactor 2 Eff	10/12	9:25	TO						1		1		1	1	1	1	
56		BioReactor 2 Eff Hg Blk	10/12	9:25	TO										1				
57		Filter Blk	10/12	-	TO									1					
58		Metals Trip Blk	10/12	-	TO								1		1				
HG blanks out of sequence																			

Customer to sign & date below - fill out from left to right.

1) Relinquished By <i>[Signature]</i>	Date/Time 10/12/2011	2) Accepted By <i>[Signature]</i>	Date/Time 10-12-11 1530
3) Relinquished By <i>[Signature]</i>	Date/Time 10-12-11 1535	4) Accepted By <i>[Signature]</i>	Date/Time 10-12-11 1535
5) Relinquished By <i>[Signature]</i>	Date/Time 10-13-11 1300	6) Accepted By <i>[Signature]</i>	Date/Time 10/14/11 900
7) Relinquished By <i>[Signature]</i>	Date/Time 10-13-11	8) Accepted By <i>[Signature]</i>	Date/Time 10-13-11
9) Seal/Locked By <i>[Signature]</i>	Date/Time 10-13-11	10) Seal/Lock Opened By	Date/Time
11) Seal/Locked By	Date/Time	12) Seal/Lock Opened By	Date/Time

Customer, IMPORTANT!
Please indicate desired turnaround.

22 Requested Turnaround

14 Days _____

7 Days _____

48 Hr _____

*Other **10-20-11**
Add. Cost Will Apply

* Metals=TRM/IMS = As, Cd, Cr, Cu, Ni, Se, Ag, Zn TRM/ICP = B, Ca, K, Li, Mg, Na.



Full-Service Analytical &
Environmental Solutions

NC Certification No. 402
SC Certification No. 99012
NC Drinking Water Cert No. 37735

Case Narrative

10/20/2011

Duke Energy Corporation (04)
Jay Perkins
13339 Hagers Ferry Road
Huntersville, NC 28078

Project: HAPS/MACT Testing Belews Creek
Project No.: J11100235
Lab Submittal Date: 10/13/2011
Prism Work Order: 1100368

This data package contains the analytical results for the project identified above and includes a Case Narrative, Sample Results and Chain of Custody. Unless otherwise noted, all samples were received in acceptable condition and processed according to the referenced methods.

Data qualifiers are flagged individually on each sample. A key reference for the data qualifiers appears at the end of this case narrative.

Please call if you have any questions relating to this analytical report.

Respectfully,

PRISM LABORATORIES, INC.

VP Laboratory Services

Reviewed By

Data Qualifiers Key Reference:

HT	Sample received and analyzed outside of the hold time.
BRL	Below Reporting Limit
MDL	Method Detection Limit
RPD	Relative Percent Difference
*	Results reported to the reporting limit. All other results are reported to the MDL with values between MDL and reporting limit indicated with a J.

This report should not be reproduced, except in its entirety, without the written consent of Prism Laboratories, Inc.



Client Sample ID	Lab Sample ID	Matrix	Date Sampled	Date Received
2011022452/FGD Purge Eff	1100368-01	Water	10/12/11	10/13/11
2011022453/BioReactor 1 Inf	1100368-02	Water	10/12/11	10/13/11
2011022454/BioReactor 2 Eff	1100368-03	Water	10/12/11	10/13/11

Samples received in good condition at 2.1 degrees C unless otherwise noted.



Duke Energy Corporation (04)
Attn: Jay Perkins
13339 Hagers Ferry Road
Huntersville, NC 28078

Project: HAPS/MACT Testing Belews
Creek
Project No.: J11100235
Sample Matrix: Water

Client Sample ID: 2011022452/FGD Purge Eff
Prism Sample ID: 1100368-01
Prism Work Order: 1100368
Time Collected: 10/12/11 00:00
Time Submitted: 10/13/11 16:25

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
General Chemistry Parameters									
pH	6.8 HT	pH Units			1	*SM4500-H B	10/14/11 11:50	JAB	P1J0265
Total Alkalinity	54	mg/L	5.0	1.4	1	*SM2320 B	10/19/11 10:50	JAB	P1J0357
Carbonate Alkalinity	BRL	mg/L	5.0	1.4	1	*SM2320 B	10/19/11 10:50	JAB	P1J0358
Bicarbonate Alkalinity	54	mg/L	5.0	1.4	1	*SM2320 B	10/19/11 10:50	JAB	P1J0359



Duke Energy Corporation (04)
Attn: Jay Perkins
13339 Hagers Ferry Road
Huntersville, NC 28078

Project: HAPS/MACT Testing Belews
Creek
Project No.: J11100235
Sample Matrix: Water

Client Sample ID: 2011022453/BioReactor 1 Inf
Prism Sample ID: 1100368-02
Prism Work Order: 1100368
Time Collected: 10/12/11 09:15
Time Submitted: 10/13/11 16:25

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
General Chemistry Parameters									
pH	7.1 HT	pH Units			1	*SM4500-H B	10/14/11 11:50	JAB	P1J0265
Total Alkalinity	39	mg/L	5.0	1.4	1	*SM2320 B	10/19/11 10:50	JAB	P1J0357
Carbonate Alkalinity	BRL	mg/L	5.0	1.4	1	*SM2320 B	10/19/11 10:50	JAB	P1J0358
Bicarbonate Alkalinity	39	mg/L	5.0	1.4	1	*SM2320 B	10/19/11 10:50	JAB	P1J0359



Duke Energy Corporation (04)
Attn: Jay Perkins
13339 Hagers Ferry Road
Huntersville, NC 28078

Project: HAPS/MACT Testing Belews
Creek
Project No.: J11100235
Sample Matrix: Water

Client Sample ID: 2011022454/BioReactor 2 Eff
Prism Sample ID: 1100368-03
Prism Work Order: 1100368
Time Collected: 10/12/11 09:25
Time Submitted: 10/13/11 16:25

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
General Chemistry Parameters									
pH	7.0 HT	pH Units			1	*SM4500-H B	10/14/11 11:50	JAB	P1J0265
Total Alkalinity	130	mg/L	5.0	1.4	1	*SM2320 B	10/19/11 10:50	JAB	P1J0357
Carbonate Alkalinity	BRL	mg/L	5.0	1.4	1	*SM2320 B	10/19/11 10:50	JAB	P1J0358
Bicarbonate Alkalinity	130	mg/L	5.0	1.4	1	*SM2320 B	10/19/11 10:50	JAB	P1J0359



Duke Energy Corporation (04)
Attn: Jay Perkins
13339 Hagers Ferry Road
Huntersville, NC 28078

Project: HAPS/MACT Testing Belews
Creek
Project No: J11100235

Prism Work Order: 1100368
Time Submitted: 10/13/2011 4:25:00PM

General Chemistry Parameters - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
Batch P1J0265 - NO PREP									
LCS (P1J0265-BS1)				Prepared & Analyzed: 10/14/11					
pH	6.83		pH Units	6.860	100	99-101			
Duplicate (P1J0265-DUP1)				Source: 1100368-03		Prepared & Analyzed: 10/14/11			
pH	6.95		pH Units	6.97			0.3	10	
Batch P1J0357 - NO PREP									
Blank (P1J0357-BLK1)				Prepared & Analyzed: 10/19/11					
Total Alkalinity	BRL	5.0	mg/L						
LCS (P1J0357-BS1)				Prepared & Analyzed: 10/19/11					
Total Alkalinity	255	5.0	mg/L	250.0	102	90-110			
LCS Dup (P1J0357-BSD1)				Prepared & Analyzed: 10/19/11					
Total Alkalinity	255	5.0	mg/L	250.0	102	90-110	0	200	
Duplicate (P1J0357-DUP1)				Source: 1100368-03		Prepared & Analyzed: 10/19/11			
Total Alkalinity	135	5.0	mg/L	131			3	20	
Batch P1J0358 - NO PREP									
Blank (P1J0358-BLK1)				Prepared & Analyzed: 10/19/11					
Carbonate Alkalinity	BRL	5.0	mg/L						
LCS (P1J0358-BS1)				Prepared & Analyzed: 10/19/11					
Carbonate Alkalinity	255	5.0	mg/L			90-110			



Duke Energy Corporation (04)
Attn: Jay Perkins
13339 Hagers Ferry Road
Huntersville, NC 28078

Project: HAPS/MACT Testing Belews
Creek
Project No: J11100235

Prism Work Order: 1100368
Time Submitted: 10/13/2011 4:25:00PM

General Chemistry Parameters - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P1J0358 - NO PREP										
LCS Dup (P1J0358-BSD1)				Prepared & Analyzed: 10/19/11						
Carbonate Alkalinity	255	5.0	mg/L				90-110	0	200	
Duplicate (P1J0358-DUP1)				Source: 1100368-03		Prepared & Analyzed: 10/19/11				
Carbonate Alkalinity	BRL	5.0	mg/L		BRL				20	
Batch P1J0359 - NO PREP										
Blank (P1J0359-BLK1)				Prepared & Analyzed: 10/19/11						
Bicarbonate Alkalinity	BRL	5.0	mg/L							
LCS (P1J0359-BS1)				Prepared & Analyzed: 10/19/11						
Bicarbonate Alkalinity	255	5.0	mg/L	250.0		102	90-110			
LCS Dup (P1J0359-BSD1)				Prepared & Analyzed: 10/19/11						
Bicarbonate Alkalinity	255	5.0	mg/L	250.0		102	90-110	0	200	
Duplicate (P1J0359-DUP1)				Source: 1100368-03		Prepared & Analyzed: 10/19/11				
Bicarbonate Alkalinity	135	5.0	mg/L		131			3	20	

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

7

19 Page 1 of 2
DISTRIBUTION
ORIGINAL TO LAB,
COPY TO CLIENT

Duke Energy
Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd
Huntersville, N. C. 28078
(704) 875-5245
Fax: (704) 875-4349

Analytical Laboratory Use Only
LIMS # J11100235
Date & Time 10-12-11 16:33
Logged By Cpt
Sample Origination From OTHER
SAMPLE PROGRAM Drinking Water
Ground Water None
Drinking Water None
Waste None
Cooler Temp (C) <1
Preserv.: 1=HCL, 2=HNO3, 3=H2SO4, 4=Ice, 5=None

HAPS/MACT Testing
Belews Creek
2) Project Name
3) Client: Bill Kennedy, Ron Laws, Allen Stowe, Wayne Chapman, Melonie Martin, Tom Johnson
4) Fax No:
5) Business Unit:
6) Process:
7) Res. Type:
8) Oper. Unit:
9) Res. Center:
10) Resp. Center:

AS&C
Brooks Rand
PO#141391
PO#13241
PRISM
PO#144725

LAB USE ONLY	11 Lab ID	13 Sample Description or ID	Se Speciation Bottle ID	Date	Time	Signature	16 Analyses Required	17 Comp. Grab	18 TDS, TSS	Hg - 245.1	Hg Dissolved, 245.1	Metals*	Se, Speciation, V_ASC	Hg 1631, V_Brand	Carbonate alkalinity, bicarbonate alkalinity, pH -	Chloride, Sulfate, Bromide - Dionex	Nitrate-nitrite, C_NO3/NO2
	2010212452	FGD Purge Eff		10/12	9:15	TO											
	53	BioReactor 1 Inf		10/12	9:15	TO											
	55	BioReactor 1 Inf Hg Blk		10/12	9:15	TO											
	54	BioReactor 2 Eff		10/12	9:25	TO											
	56	BioReactor 2 Eff Hg Blk		10/12	9:25	TO											
	57	Filter Blk		10/12	-	TO											
	58	Metals Trip Blk		10/12	-	TO											
		46. Blankets out of sequence															

Customer to sign & date below - fill out from left to right.

1) Relinquished By [Signature] Date/Time 10/12/2011 15:35
 2) Accepted By [Signature] Date/Time 10-12-11 15:30
 3) Relinquished By [Signature] Date/Time 10-12-11 15:35
 4) Accepted By [Signature] Date/Time 10-15-11 15:35
 5) Relinquished By [Signature] Date/Time 10/13/11 15:20
 6) Accepted By [Signature] Date/Time 10/13/11 15:20
 7) Relinquished By [Signature] Date/Time 10-13-11 13:00
 8) Accepted By [Signature] Date/Time 10-13-11 13:00
 9) Seal/Locked By [Signature] Date/Time 10-13-11
 10) Seal/Locked Opened By [Signature] Date/Time 10-13-11
 11) Seal/Locked By [Signature] Date/Time 10-13-11
 12) Seal/Locked Opened By [Signature] Date/Time 10-13-11

22 Requested Turnaround
 14 Days _____
 7 Days _____
 48 Hr _____
 *Other 10-20-11
 Add. Cost Will Apply

Customer, IMPORTANT!
 Please indicate desired turnaround.

Comments
Metals=TRM/IMS = As, Cd, Cr, Cu, Ni, Se, Ag, Zn TRM/ICP = B, Ca, K, Li, Mg, Na,
10-13-11 16:25
10/10/11 16:25
1164368
2.1°



**APPLIED SPECIATION
AND CONSULTING, LLC**

18804 Northcreek Parkway Bothell, WA, 98011
Tel: (425) 483-3300 Fax: (425) 483-9818
www.appliedspeciation.com

October 21, 2011

Jay Perkins
Duke Energy Analytical Laboratory
Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd.
Huntersville, NC 28078
(704) 875-5245

Project: HAPS/MACT Testing Belews Creek (LIMS # J11100235)

Dear Mr. Perkins,

Attached is the report associated with four (4) aqueous samples submitted for selenium speciation analysis on October 13, 2011. The samples were received on October 14, 2011 in a sealed cooler at 0.7°C. Selenium speciation analysis was performed via ion chromatography inductively coupled plasma dynamic reaction cell mass spectrometry (IC-ICP-DRC-MS). Any issues associated with the analysis are addressed in the following report.

If you have any questions, please feel free to contact me at your convenience.

Sincerely,

A handwritten signature in black ink that reads "Ben Wozniak".

Ben Wozniak
Project Manager
Applied Speciation and Consulting, LLC

Applied Speciation and Consulting, LLC

Report prepared for:

Jay Perkins
Duke Energy Analytical Laboratory
Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd.
Huntersville, NC 28078

Project: HAPS/MACT Testing Belews Creek (LIMS # J11100235)

October 21, 2011

1. Sample Reception

Four (4) aqueous samples in 125mL HDPE bottles (provided by Applied Speciation and Consulting) were submitted for selenium speciation analysis on October 13, 2011. The samples were received on October 14, 2011 in a sealed container at 0.7°C.

The samples were received in a laminar flow clean hood void of trace metals contamination and ultra-violet radiation. Upon reception, the samples were designated discrete sample identifiers. An aliquot of each sample was filtered (0.45µm) and these filtrates were stored in a secure, monitored cryofreezer (maintained at a temperature of -80°C) until selenium speciation analysis could be performed via ion chromatography inductively coupled plasma dynamic reaction cell mass spectrometry (IC-ICP-DRC-MS).

2. Sample Preparation

All sample preparation is performed in laminar flow clean hoods known to be free from trace metals contamination. All applied water for dilutions and sample preservatives are monitored for contamination to account for any biases associated with the sample results.

Selenium Speciation Analysis by IC-ICP-DRC-MS Prior to analysis, an aliquot of each sample was filtered with a syringe filter (0.45µm) and injected directly into a sealed autosampler vial. No further sample preparation was performed as any chemical alteration of the samples may shift the equilibrium of the system resulting in changes in speciation ratios.

3. Sample Analysis

All sample analysis is preceded by a minimum of a five-point calibration curve spanning the entire concentration range of interest. Calibration curves are performed at the beginning of

each analytical day. All calibration curves, associated with each species of interest, are standardized by linear regression resulting in a response factor. All sample results are **instrument blank corrected** to account for any operational biases associated with the analytical platform.

Prior to sample analysis, all calibration curves are verified using second source standards which are identified as initial calibration verification standards (ICV).

Ongoing instrument performance is identified by the analysis of continuing calibration verification standards (CCV) and continuing calibration blanks (CCB) at a minimal interval of every ten analytical runs.

Selenium Speciation Analysis by IC-ICP-DRC-MS All samples for selenium speciation analysis were analyzed by ion chromatography inductively coupled plasma dynamic reaction cell mass spectrometry (IC-ICP-DRC-MS) on October 17-18, 2011. An aliquot of each sample is injected onto an anion exchange column and mobilized by a basic ($\text{pH} > 7$) gradient. The eluting selenium species are then introduced into a radio frequency (RF) plasma where energy-transfer processes cause desolvation, atomization, and ionization. The ions are extracted from the plasma through a differentially-pumped vacuum interface and travel through a pressurized chamber (DRC) containing a specific reactive gas which preferentially reacts with interfering ions of the same target mass to charge ratios (m/z). A solid-state detector detects ions transmitted through the mass analyzer and the resulting current is processed by a data handling system.

Retention times for each eluting species are compared to known standards for species identification.

4. Analytical Issues

The overall analyses went well and no significant analytical issues were encountered. All quality control parameters associated with these samples were within acceptance limits with the following exceptions:

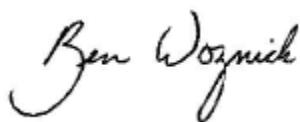
The recoveries associated with the matrix spike (MS) and matrix spike duplicate (MSD) performed on the sample identified as FGD Purge Eff were below the established control limit of 75% for selenocyanate (54.4% and 51.2%, respectively). The MS and MSD also included selenite in the spiking solution which yielded elevated recoveries (139.1% and 143.3%, respectively). The low recoveries for selenocyanate correlate with the elevated recoveries of selenite suggesting that the sample matrix induces species conversion. The fact that no species conversion was observed in the ICV or CCVs, which contain both selenite and selenocyanate, demonstrates that the applied method stabilizes these selenium species in solution. Since the conversion of selenocyanate to selenite in the MS and MSD is a function of the sample matrix and the recoveries confirm a mass balance, no corrective action was required. The reported results are deemed representative of the supplied samples and suggest that selenocyanate is not stable in the spiked sample matrix.

The estimated method detection limits (eMDLs) for selenite, selenate, and selenocyanate are generated from replicate analyses of the lowest standard in the calibration curve. Not all selenium species are present in preparation blanks; therefore, eMDL calculations based on preparation blanks are artificially biased low.

The eMDL for methylseleninic acid and selenomethionine is calculated from the average eMDL of selenite, selenate, and selenocyanate. The calibration does not contain methylseleninic acid or selenomethionine due to impurities in these standards which would bias the results for other selenium species.

If you have any questions or concerns regarding this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Ben Wozniak". The signature is written in a cursive, flowing style.

Ben Wozniak
Project Manager
Applied Speciation and Consulting, LLC

Selenium Speciation Results for Duke Energy
 Project Name: HAPS/MACT Testing Belews Creek
 Contact: Jay Perkins
 LIMS #J11100235

Date: October 21, 2011
 Report Generated by: Ben Wozniak
 Applied Speciation and Consulting, LLC

Sample Results

Sample ID	Se(IV)	Se(VI)	SeCN	MeSe(IV)	SeMe	Unknown Se Species (n)
FGD Purge Eff	12.0	973	ND (<1.3)	ND (<1.5)	ND (<1.5)	0 (0)
BioReactor 1 Inf	13.3	995	ND (<0.34)	1.56	ND (<0.37)	0 (0)
BioReactor 2 Eff	2.19	3.70	ND (<0.34)	ND (<0.37)	ND (<0.37)	0 (0)
Metals Trip Blk	ND (<0.097)	ND (<0.055)	ND (<0.067)	ND (<0.073)	ND (<0.073)	0 (0)

All results reflect the applied dilution and are reported in µg/L

ND = Not detected at the applied dilution

SeCN = Selenocyanate

MeSe(IV) = Methylseleninic acid

SeMe = Selenomethionine

Unknown Se Species = Total concentration of all unknown Se species observed by IC-ICP-MS

n = number of unknown Se species observed

Selenium Speciation Results for Duke Energy
 Project Name: HAPS/MACT Testing Belews Creek
 Contact: Jay Perkins
 LIMS #J11100235

Date: October 21, 2011
 Report Generated by: Ben Wozniak
 Applied Speciation and Consulting, LLC

Quality Control Summary - Preparation Blank Summary

Analyte (µg/L)	PBW1	PBW2	PBW3	PBW4	Mean	StdDev	eMDL*	eMDL 10x	eMDL 50x	eMDL 200x
Se(IV)	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.097	0.48	1.9
Se(VI)	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.055	0.28	1.1
SeCN	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.067	0.34	1.3
MeSe(IV)	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.073	0.37	1.5
SeMe	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.073	0.37	1.5

eMDL = Estimated Method Detection Limit

*Please see narrative regarding eMDL calculations

Quality Control Summary - Certified Reference Materials

Analyte (µg/L)	CRM	True Value	Result	Recovery
Se(IV)	LCS	9.57	11.24	117.5
Se(VI)	LCS	9.48	10.01	105.6
SeCN	LCS	8.92	9.239	103.6
MeSe(IV)	LCS	6.47	5.847	90.4
SeMe	LCS	9.32	9.200	98.7

Selenium Speciation Results for Duke Energy
 Project Name: HAPS/MACT Testing Belews Creek
 Contact: Jay Perkins
 LIMS #J11100235

Date: October 21, 2011
 Report Generated by: Ben Wozniak
 Applied Speciation and Consulting, LLC

Quality Control Summary - Matrix Duplicates

Analyte (µg/L)	Sample ID	Rep 1	Rep 2	Mean	RPD
Se(IV)	FGD Purge Eff	12.0	11.9	11.9	0.8
Se(VI)	FGD Purge Eff	973.3	1020	996.7	4.7
SeCN	FGD Purge Eff	ND (<1.3)	ND (<1.3)	NC	NC
MeSe(IV)	FGD Purge Eff	ND (<1.5)	ND (<1.5)	NC	NC
SeMe	FGD Purge Eff	ND (<1.5)	ND (<1.5)	NC	NC

ND = Not detected at the applied dilution

NC = Value was not calculated due to one or more concentrations below the eMDL

Quality Control Summary - Matrix Spike/ Matrix Spike Duplicate

Analyte (µg/L)	Sample ID	Spike Conc	MS Result	Recovery	Spike Conc	MSD Result	Recovery	RPD
Se(IV)	FGD Purge Eff	1112	1559	139.1**	1112	1606	143.3**	3.0
Se(VI)	FGD Purge Eff	1009	2025	101.9	1009	2077	107.1	2.6
SeCN	FGD Purge Eff	915.0	497.9	54.4**	915.0	468.2	51.2**	6.1

** The recovery is outside the established control limits of 75-125%; please see narrative

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM



Duke Energy Analytical Laboratory

Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd
Huntersville, N. C. 28078
(704) 875-5245
Fax: (704) 875-4349

Analytical Laboratory Use Only

LIMS #

J11100235

Matrix: OTHER

Samples
Originating
FromNC
SC

Logged By

cpt

Date & Time

10-12-11

1633

SAMPLE PROGRAM

Ground Water

Drinking Water

NPDES

Waste

UST

RCRA

Page 31 of 32

Page 1 of 2

DISTRIBUTION
ORIGINAL to LAB,
COPY to CLIENT

1) Project Name HAPS/MACT Testing
Belews Creek

2) Phone No:

AS&C

Brooks Rand

Cooler Temp (C)

2) Client: Bill Kennedy, Ron Laws, Allen Stowe,
Wayne Chapman, Melonie Martin, Tom
Johnson

4) Fax No:

PO#133241

PO#141391

Preserv.: 1=HCL
H₂SO₄ 3=HNO₃
4=Ice 5=None

5) Business Unit:

6) Process:

Mail Code:

8) Oper. Unit:

9) Res. Type:

10) Resp. Center:

MR

PRISM

PO#144725

Customer to complete all
appropriate non-shaded areas.

16 Analyses
Required

17 Comp.

18 Grab

TDS, TSS

Hg - 245.1

Hg Dissolved, 245.1

Metals*

Se, soluble

Se, Speciation, V_ASC

Hg 1631, V_BRand

Carbonate alkalinity,

bicarbonate alkalinity,

alkalinity total (4.5), pH -

V_Prism

Chloride, Sulfate,

Bromide - Dioxex

Nitrate-nitrite, C_NO3/NO2

LAB USE ONLY

11) Lab ID

Se Speciation Bottle

ID

13) Sample Description or ID

Date

Time

Signature

FGD Purge Eff

10/12

TO

BioReactor 1 Inf

10/12

9:15

TO

BioReactor 1 Inf Hg Blk

10/12

9:15

TO

BioReactor 2 Eff

10/12

9:25

TO

BioReactor 2 Eff Hg Blk

10/12

9:25

TO

Filter Blk

10/12

-

TO

Metals Trip Blk

10/12

-

TO

HG blanks out of sequence

Customer to sign & date below - fill out from left to right.

1) Relinquished By *[Signature]* Date/Time 10/12/2011

3) Relinquished By *[Signature]* Date/Time 10-12-11 1535

5) Relinquished By *[Signature]* Date/Time 10-13-11 1300

7) Relinquished By *[Signature]* Date/Time 10-13-11 1500

9) Seal/Locked By *[Signature]* Date/Time 10-13-11

11) Seal/Locked By *[Signature]* Date/Time

2) Accepted By *[Signature]* Date/Time 10-12-11 1530

4) Accepted By *[Signature]* Date/Time 10-15-11 1535

6) Accepted By *[Signature]* Date/Time

8) Accepted By *[Signature]* Date/Time

10) Seal/Lock Opened By *[Signature]* Date/Time 10/14/11 1500 0.72

12) Seal/Lock Opened By *[Signature]* Date/Time 10/14/11 1500

Customer, IMPORTANT!
Please indicate desired turnaround.

22) Requested Turnaround

14 Days

7 Days

48 Hr

* Other 10-20-11
Add. Cost Will Apply

* Metals=TRM/IMS = As, Cd, Cr, Cu, Ni, Se, Ag, Zn TRM/ICP = B, Ca, K, Li, Mg, Na,



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Huntersville, N.C. 28078
(704) 875-5245
Fax: (704) 875-4349

Customer must Complete

1) Product Name	HAPS/MACT Testing	2) Phone No:	
3) Client:	Belevs Creek	4) Fax No:	
5) Business Unit:	Johnson	6) Process:	
7) Oper. Unit:		8) Res. Type:	
		9) Resp. Center:	

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AS&C
PO#133241

Brooks Rand
PO#141391

PRISM
PO#144725

appropriate non-shaded areas.

Analytical Laboratory Use Only

Method: OTHER

Sample Originating From: NC SC

Drinking Water: Waste: RCRA

19 Page 1 of 2
DISTRIBUTION
ORIGINAL TO LAB,
COPY TO CLIENT

LAB USE ONLY		Se Specification Bottle		13 Sample Description or ID		Date	Time	Signature	17 Comp.	18 Grab	TDS, TSS	Hg - 245.1	Hg Dissolved, 245.1	Metals*	Se, soluble	Se, Speciation, V_ASC	Hg 1631, V_BRand	Carbonate alkalinity, bicarbonate alkalinity, total (4.5), pH - V_Prism	Chloride, Sulfate, Bromide - Dionex	Nitrate-nitrite, C_NO3/NO2
1) Lab ID	301022452			FGD Purge Eff		10/12		70			1	1	1	1	1	1		1	1	1
	53			BioReactor 1 Inf		10/12	9:15	70				1	1	1	1	1		1	1	1
	55			BioReactor 1 Inf Hg Blk		10/12	9:15	70				1	1	1	1	1		1	1	1
	54			BioReactor 2 Eff		10/12	9:25	70				1	1	1	1	1		1	1	1
	56			BioReactor 2 Eff Hg Blk		10/12	9:25	70									1			
	57			Filter Blk		10/12		70												
	58			Metals Trip Blk		10/12		70												
HG blanks out of sequence																				

Customer to complete appropriate columns to right

Customer to sign & date below - fill out from left to right.

1) Relinquished By	10/12/2011	2) Accepted By	10/12/11 1530	22 Requested Turnaround	14 Days
3) Relinquished By	10/12/11 1535	4) Accepted By	10/15/11 1535	7 Days	
5) Relinquished By	10/13/11 1520	6) Accepted By	10/13/11 1520	48 Hr	
7) Relinquished By	10/13/11 1300	8) Accepted By		Other	10-20-11
9) Seall/locked By	10-13-11	10) Seall/lock Opened By		Add Cost Will Apply	
11) Seall/locked By		12) Seall/lock Opened By			
Comments					
* Metals=TRM/IMS = As, Cd, Cr, Cu, Ni, Se, Ag, Zn, TRM/ICP = B, Ca, K, Li, Mg, Na.					
Customer, IMPORTANT! Please indicate desired turnaround.					